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KENAF CARDBOARD AND METHOD FOR PRODUCTION THEREOF

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ABSTRACT OF THE DISCLOSURE

Cardboard for use in making roller discs for roller gins employed in cotton ginning, including shredded kenaf fibres, cotton rags, fibrous gin waste, and a binder which is a mixture of rosin and bitumen. The method for its protection is characterized by the extent of shredding of the fibrous components and their subsequent mixing with the shredded kenaf fibres.

The present invention relates to cardboard and methods for production thereof, and more particularly, to cardboard made of semi-finished fire products with a binder.

The invention can be most effective when used as artificial technical leather on machines for ginning cotton such as roller gins.

Prior-art cardboard has not been used as artificial technical leather on roller gins because it lacks the sufficient capability for gripping fibres of the cotton being ginned.

Gin rollers are fashioned as discs normally made of technical leather. The latter contains animal fat which adversely affects the capacity of a roller to grip fibres of the cotton being ginned thus impairing the efficiency of said roller gin.

It has been already proposed to use raw or cured rubber as artificial technical leather for gin rollers, but, in operation, said rubber material softens due to heavy friction and dirties the fibre being ginned; furthermore, rollers made of such artificial leather often fail to grip fibres of the cotton being ginned. As a result, the quality of the cotton fibre thus produced is affected, the efficiency of the roller gin sharply declines and its operation becomes fire-hazardous.

Whether cardboard is suited for this purpose, largely depends on the content of fibred components in the mass from which it is produced and on their ratio.

The methods for producing cardboard from fibred components involve their grinding to a preset extent in a water medium as well as their successive introduction into the mass from which the cardboard is produced, followed by a treatment of the formed cardboard, including pressing and drying, and its grading.

The components, their ratios and the cardboard production technique, as well as its utilization for cotton ginning on special machines are not known.

It is an object of the present invention to provide a material for manufacturing discs of gin rollers cheaper than technical leather.

Another object of the present invention is to increase the efficiency of roller gins in processing raw cotton and to extend the service life of the rollers in said gins.

Yet another object of the invention is to provide a material for gin rollers that would preclude any chance of fire during the ginning of raw cotton.

These and other objects are achieved by providing cardboard made of cotton rags, kraft pulp, fibrous gin waste and a binder, wherein, according to the invention, there are kenaf fibres constituting 20 to 30 percent by weight and substantially 50 mm. in length, the weight percentage ratio of the above components being as follows:

Cotton rags	25 to 30
Fibrous gin waste	5 to 10
Binder	5 to 10
Kraft pulp	The rest

A reduction in the weight percent of fibres to less than 20 leads to the gin roller discs that are made from such cardboard of reduced fibre content being discs of decreased efficiency as compared with similar gins with rollers made of leather or raw rubber. An increase in the weight percent of kenaf fibres to above 30 renders the manufacture of cardboard practically impossible because shredded kenaf fibres mixed with other components would clog holes in the machinery used and would be wound around its rotating parts.

An increase in the weight percent of cotton rags to above 30 would raise the elasticity of cardboard but decrease its mechanical strength; a reduction in the content of cotton rags in the mass to below 25% would produce the reverse effect.

An increase in the mechanical strength of cardboard by raising the content of fibrous gin waste or kraft pulp to more than 10% would reduce the cardboard elasticity, while a decrease in the content of said fibrous gin waste or kraft pulp to less than 5% would reduce the mechanical strength of the resulting cardboard.

If the binder content in cardboard is below 5%, it fails to ensure the binding of the components in the mass, whereas an increase in its content to more than 10% is senseless, as this does not improve its binding properties.

The length of kenaf fibres is made equal to 50 mm., which helps said fibres to be fixed in the mass and to catch cotton fibres when cardboard is used in gin rollers.

It is expedient that the binder content in weight parts be as follows:

Rosin	1
Bitumen	2

An increase in the rosin content in the binder at the expense of bitumen would affect adversely the water-repellent property of the resulting cardboard, while an increase in the bitumen content at the expense of rosin would impair the binding properties of said cardboard.

The method of producing said cardboard consists of shredding cotton rags, fibrous gin waste, kraft pulp and a binder in a water medium; forming multiple cardboard sheets from the obtained mass; and pressing and drying said sheets. According to the present invention, the cotton rags are first shredded to 20 to 25° S-R (Schopper-Riegler grindability index), then, together with the fibrous gin waste, kraft pulp and a binder, they are further ground to 40 to 55° S-R, and, finally, prior to forming the cardboard, the kenaf fibres are reduced to substantially 55 mm. in length and introduced into the obtained mass.

The proposed invention permits the replacement of expensive technical leather heretofore utilized for manufacturing discs of gin rollers by a material several times cheaper than leather, thereby increasing the efficiency of said roller gins and considerably extending the service life of the rollers.

In the course of cardboard production, various ratios have been tried of the components making up the initial mass, the weight ratio of rosin and bitumen in the binder being 1:2, with the following results obtained.

EXAMPLE 1

With a weight percent of the shredded kenaf fibres of 20, cotton rags—30, fibrous gin waste—10, binder—10 and kraft pulp—30, the efficiency of the roller gin showed an increase, as compared with that of a roller gin fitted with rollers made of leather or raw rubber.

EXAMPLE 2

With a weight percent of the shredded kenaf fibres of 24, cotton rags—27, fibrous gin waste—9, binder—9, and kraft pulp—31, the efficiency of the roller gin considerably increased.

EXAMPLE 3

With a weight percent of the shredded kenaf fibres of 26 to 28, cotton rags—27, fibrous gin waste—9, binder—9 and kraft pulp—29 to 27, the efficiency of the roller gin was the highest of the three examples and substantially greater than that of the pilot model of the same type fitted with roller discs made of technical leather.

The method of producing cardboard according to this invention consists in that cotton rags are first shredded in a water medium to 20 to 25° S-R (Schopper-Riegler grindability index) and, then, added to the mass, are fibrous gin waste, kraft pulp and a binder in that order and all these components are ground in said water medium to 40 to 55° S-R. After that, the prepared mass is mixed with kenaf fibres separately ground to 50 mm. in length, whereupon said mass is then ready for forming multiple cardboard sheets therefrom, by means of pressing the cardboard under a pressure of some 350 kg./cm.^{2}, and then calendering it and drying it to a preset moisture content.

The production of cardboard according to this invention is carried out on the same equipment commonly used in the paper and pulp industry, with no additional facilities required.

The cardboard thus produced is used for manufacturing conventional discs for gin rollers and other cotton machines.

The present invention enables the replacement of leather discs in cotton gins by cheaper cardboard ones that help appreciably increase the efficiency of said gins and extend the service life of their rollers two-fold or more, which has been proved in production tests and through actual practice in the cotton industry.

What is claimed is:

1. Cardboard comprising cotton rags; fibrous gin waste; a suitable binder; shredded kenaf fibres substantially 50 mm. in length, and kraft pulp, the weight percentage ratio of said components being as follows:

Kenaf fibres	25 to 30
Cotton rags	25 to 30
Fibrous gin waste	5 to 10
Binder	5 to 10
Kraft pulp	The rest

2. Cardboard as claimed in claim **1**, wherein the binder consists of 1 part by weight of rosin and 2 parts by weight bitumen.

3. A method of producing cardboard comprising shredding cotton rags to 20 to 25° S-R (Schopper-Riegler grindability index), adding thereto fibrous gin waste, kraft pulp, and a binder in that order, further shredding cotton rags to 40 to 55° S-R, introducing shredded kenaf fibres reduced substantially to a length of 50 mm., forming multiple sheets of cardboard from the prepared mass, combining said sheets and pressing and drying said cardboard sheets.

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